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ABSTRACT

This report summarizes information found in a survey of the literature on radio as an educational medium which covered the published literature from many areas of the world. Comments on the literature reviewed are provided throughout the text, which is organized under seven major headings: (1) Radio, Mass Medium; (2) Radio, the Medium (broadening the scope of the medium, radio cassettes, radio as a medium for distance education, and radio for adult education); (3) Educational Radio (harnessing the medium for education, supporting visual materials and radio-vision, one sensory channel, and cost); (4) Comparing Educational Media; (5) Educational Radio--Developing the Programs (supporting communication and evaluation, training provisions, analyzing the audience, attitudes, rigorous instructional design, program preferences, and listening habits); (6) Suggested Model for Developing an Educational Radio Program; and (7) Suggested Model for Educational-Radio Script). (12 references) (CGD)

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RADIO, MASS MEDIUM

"Radio is ubiquitous. It is the most pervasive medium on earth". (Keith & Krause, 1986)

The average adult spends 3 1/2 hours a day listening to Radio; 80% of all adults listen to Radio for between 15 and 16 hours a week. (Keith & Krause, U.S.A., 1986)

'Mass' had been the new eighteenth-century term for what was formerly described as the 'mob'. The Oxford Dictionary defines 'mass of human beings: A compact body; an aggregate in which individuality is lost' This means that a 'mob' or a mass of people acts together as a group (probably stimulated by emotional and primitive elements).

Whereas the mass-communication media reach a mass of people who are not necessarily together. Mass communication causes communication between people who did not have language or ideas in common before, because before, they gained information from different sources, and now with books, newspapers, radio and TV they receive information from the same sources.

This implies that mass communication devices now give a mass of people access to the same information - but it never implies that it is a particularly emotional message, nor that now they are about to be united in their reaction, as the mob is.

On the contrary and that is one of the beauties of it - many people of various cultural backgrounds receive the same information which will unite their cultural backgrounds. That is a particular advantage in a multicultural country such as S.A. It is also true for a variety of subjects to cater for a variety of needs or a variety of fields of interest. For example, radio.

One can listen to it and be entertained by the dramatic story and the music. One can listen to a programme and draw some information from it; another can draw another bit of information from the same

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programme. One may be inspired by the content or by the actor's behaviour.

The influence of a mass medium is caused by the message that comes from the medium, but is influenced by the cultural background the user already has and by the circumstances in which it occurs as well. If attention to the medium is not in an assembly situation where feelings, violence, etc. are involved, there is no similarity between mass and mob.

However, Education through mass media is more effective if it is addressed to a panogeneous audience and meets specific needs. (Schramm, 1977).

"The obvious advantages of modes of mass communication are that the sender can communicate with multitudes of receivers at the same time and at distances beyond the achievable by interpersonal communication. But the contact becomes impersonal and the risk of ambiquity and misunderstanding much greater. Feedback is an impossibility"... "thus the massage has to carry a heavy freight" (Crisell, P.Y.)

Radio, from this point of view, is a mass medium that can be harnassed to enhance an education campaign since it can span long distances and reach much larger numbers of students than could ever assemble in a classroom or a lecture theater.

However, it may be useful to record some of the principles learned in studies of campaigns about the choice of instructional media.

(1) All media are campaign media. A well-planned campaign will use whatever media it can command that will reach the audience it wants to reach. The important variable seems to be not so much the characteristics of the media as where they go and who used them. Thus, every kind of media from the most complex and expensive (e.g. television) to the simplest and least expensive

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(e.g traditional media such as puppet shows, dances, and ballads) has been used to teach effectively.

(2) Radio, because of its wide coverage relatively low unit cost, and ability to reach beyond literates and beyond power mains, has proved to be the pre-eminent medium for development campaigns. (e.g. After three radio spots per day were broadcast in the Hyderabad District of Pakistan, more than half of the women who went to clinics credited the broadcasts for the action they had taken.)

(3) A combination of media is likely to accomplish more than any medium by itself. Gillespie (1971:8) compared a radio-only campaign in Iran with a campaign that combined radio with other means of conveying information. Both were effective, but the radio campaign raised the number of acceptors by about 35 per cent, the combined campaign by about 55.

Radio, the Medium

A significant fact "about radio is that it is a blind medium. We cannot see its messages, they consist only of noise and silence, and it is from the sole fact of its blindness that all radio's other distinctive qualities - the nature of its language, its jokes, the way in which its audiences use it - ultimately derive". (Crisell 1986, p.3)

There is no image and no text. The contact is non-visual. The receivers/listeners/audience cannot see the sender/broadcaster, nor are they offered the compensation of a visible and lasting message (as they are in printed literature). Its codes are purely auditory, consisting of speech, music, sounds, and silence, and in order to be accepted are relatively simple.

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Messages on radio consist primarily of speech expressed by voices since they are not supported by visuals they are often supported by other voices, or sounds that describe the source of the voice, and so provide the listener with some sense of reality. (That is done by 'sound effects') This peculiar quality of radio, its blindness, can be harnassed to the educational carriage to improve its educational quality since the listener is compelled to support the sound message by using his own imagination, to "picture" the message for himself. Now that his imagination is activated, he exercises imagination further, beyond the explicit content of the message. No other medium has this educational power. Here lies the most powerful feature of radio; in intriging and developing the abstract thinking of its audience, and in enriching and activating the listener's imagination.

Developing thinking skills in the people is, in my opinion, the core of modern education rather than feeding the learner with knowledge that would be obsolete information by the time he leaves school.

Radio signs and codes are mainly words, sounds, and music. To be more specific, one can classify the above signals further:

Signs that resemble the object they represent are icon signs, e.g. the sound that a motor makes represents the motor. The index sign is directly linked to its object, e.g. each radio programme has its index sound before it begins.

A symbol sign traditionally represent a concept or body, for example a national anthem.

Radio signs are all made up of noises and silence, using time (not space) as the major structuring agent. (Hawkes, 1977 in Crisell). Noises are made up of words, sounds, and music.

Words, the main carriers of the educational message, are symbols: "Their symbolism is the basic of radio's imaginitive appeal" (Crisell, p.46), but since they are spoken they are also an index to

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the speaker. This fact should be taken into account by the educationalist who produces a radio programme, thus: not only the meaning of the words but also what they indicate are important. Criteria for evaluating voices are sex, age, accent, level of voice, its clarity, etc. Sounds can be used to icon an image, e.g. the sound that the resident's car makes, or (more often) index, e.g. the sound that a police car makes.

Sound can be used to carry the main message, e.g. the sound of a car moving or be used as a background sound, for example to emphasise the mood of a person or her environment. However, it is within the power of the radio producer to prioritise sounds for the listener, placing the important ones in the foreground, eliminating the irrelevant ones, or reducing them to the level of less important ones, e.g.

1. Fading in party chatter then fading it down and holding it under the conversation, or even fade it out altogether.

2. Allowing one or two low sounds to stand for what would actually be a stream of background noise. (Coffman 1890 in Crisell 1986, p.48) The last example is almost a sound effect.

The sound-effect is a sound that is produced by any kind of instrument(s) or object(s) and symbolises or indexes, or is even "pseudo" iconic of an authentic sound. Sometimes the sound-effect plays the role of an "acoustic shorthand", e.g. the sound of footsteps with voice-over.

The radio broadcaster <u>discriminates between important and unimportant sounds</u>. He has to make this level of importance clear to the listener, and also to clarify the sound if its meaning is in doubt, for example by accompanying it with an explanatory comment, (which may not be written into the script). This function is analogous with the captioning of TV.

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"Cooking" sound thus have a significant importance in the production of an educational radio programme, because they influence the listener's selection of message retention and his attitude towards it.

Therefore it is true that the production of a radio programme, even from the technical point of view, has to be conducted by an educationalist.

This is true for all educational projects, irrespective of the medium used.

Music is another Radio code. It is often used to indicate, e.g., the beginning and end of a programme, the mood of the presenter, etc. It is also used to "colour" the radio picture, e.g. background music, and to entertain by filling gaps, or when a subject is to be changed, for example in a magazine-type programme. But music can carry the main message as it is a sound, and sound is the radio language. This occurs only rarely, when the sound of music is the subject of the radio programme. Crisell (1986) deligates 5 functions to radio music.

1. Music is a "framing " or "boundary" (indexical)

2. As a link between the scenes or programme items (indexical/symbolic)

3. Mood music (symbolic)

4. Music as a kind of stylised replacement for naturalistic sound-effects (Iconic).

5. Music as a part of the ordinary sounds of the world that radio portrays (Iconic).

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The negative of sounds, words, and music is silence. Just as negative numbers are meaningful, so is silence. The context in which the silence is located guides the producer and the listener, e.g. a silence before music means that now we are waiting for something.

Silence after a music means that the music has stopped. The silence can be effective if used to intrige the imagination and thoughts of the listener. Radio educationalists and producers should avoid having silences in a radio programme as a result of carelessness, but should use them as a legitimate radio code, which ought to be meaningful, by carefully planning built-in silences that will co-carry the programme and enhance its educational meaning. Silence, when used correctly can make a dramatic effect.

Like books, radio talks describe the world to the student, but radio, unlike books can offer a direct impression of the world. It can provide the student with experience that would otherwise be inaccessible; these are presented to him rather than aimed at a respondent. Such are foreign languages spoken in context by native speakers (not as a model for direct imitation but simply as an authentic impression), dramatic productions of Shakespeare, interviews with eyewitnesses, the sound of a clavichord, etc. The advantage of the medium in these cases is that the audio message can be consentrated upon without being distracted by an irrelevant image of the speaker. (On the other hand the medium is poor when a visual message has to be delivered). "It is the only medium in which reality is in some sense directly presented yet must at the same time be imagined." ... "both these processes are prized in education"... since "they increase learning motivation" (Ibid p.116)

It may be summarised as follows:

Radio language is composed of words, sounds, silences, and music. If we want to harness radio for education we should learn to discriminate between its signs and codes, and we should learn to take advantage of each of its qualities.

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That will be educationally effective only if we develop listening skills in our clients. The learner as well as the producer should know, comprehend, and be able to evaluate the sounds, music, and words that we deliver.

Broadening the Scope of the Medium

Radio Casettes.

Radio as a medium has its limitations, which lie in the temporary nature of its codes. When compared to the written/printed medium, the student can find it harder to understand messages and or to carry out instructions that do not allow him to pause or refer back.

When these irritations are identified, repetitions and reinforcement are needed. The use of audio cassettes is the ultimate solution to these kinds or problems: repetition and pace.

When these limitation are identified, and the subject still seems to be feasible for delivery on radio, the following techniques can be used: make a limited number of main points, reinforce them through repetition, and provide concrete illustrations of abstract principles. The use of audio casettes can help tremendously. Still, there are "subjects for which spoken works are just not enough such as advanced chemistry or how to tie knots." In these cases use visual supporting materials or don't attempt to tackle them on radio.

The use of casettes improves audio services, also for the deduction of the distance learner. He can select the subject he wants to attempt, the time, pace, repetition, etc.

However, if the programme is to be broadcast, or recorded and then played and replayed, is of concern to the producer since it effects his production strategy. For example: the use of pauses, simplicity of language, count of topics, use of silences, and instructions will differ. User's strategy will also be different since the casettes

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reduce the empheral flair of the medium, give more learner control and learner centered meaning to the medium, but also create logistical problems such as more sophisticated and specialised equipment, storage problems, etc.

The use of audio casettes is more flexible than the use of radio. Smith and Tomlinson (1984), for example, report on an innovative implication of the use of this technique. They used audio casettes for the purpose of enhancing teaching skills. They termed the method RAP (Radio Assisted Practic) "which allows unobstructive communication from tutor to trainee teacher during actual teaching activity. This innovation is introduced in the context of traditional theory-practice integration concerns and its feasibility is assessed in terms of the psychology of skill. The findings of studies of the use of RAP with a small number of B.Ed. and PGCE students on school practice confirm the considerable power of the technique".

The reader can find broader applications of the use of this technique in the chapter entitled "ideas that we can implement" in this report.

Radio is a Distance Education Medium.

Perration (1984, p. 42-46) describes the implications of using or broadening the scope of radio for educating at a distance:

As we have seen three are advantages for our students in using radio along with other media. Radio reaches our students instantly and can provide a liveliness and stimulation which it is difficult to achieve through print alone. Radio programmes can be made cheaply. And radio has particular educational advantages from which our students can benefit. In making radio programmes, however, a distance teaching institution is most likely to co-operate with a broadcasting service. Much of the production work which is done by the editor of correspondence lessons will be done by a producer, who may be on the

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staff of the broadcasting organisation rather than the distance teaching institution.

We also need to plan broadcasts and other media together so that the relationships between them are clear. (It is very confusing for students if, in a coursee, correspondence lessons say one thing, radio programmes a second, and teachers in a face-to-face session a third.)

The first is to remember that one can cover only a limited amount of ground in any one radio programme. Detailed exposition, where all the detail must be mastered and remembered by the student, belongs better in print than on radio. It is necessary always to bear in mind that our listener cannot turn back the radio, if he has missed something, or listen to it a second time if he does not quite understand. In many cases, too, reception conditions may be poor so that our students may not even hear the programmes clearly.

Next, any radio programme needs variety. Programmes that consist of a single voice giving a lecture are unlikely to be an effective, or the most interesting, stimulus for a student. Radio lends itself to variety. If we can include different voices, dialogue, drama and discussions, field recordings, and music where this is appropriate, the programmes will be more attractive to our students and will speak more clearly to their condition.

Thirdly, most programmes are made on the assumption that the listener simply listens to them and does not himself undertake any activity until after the programme has finished. There are good reasons for this. It is, for example, difficult for students to write notes while a radio programme is on. Some radio programmes, however, are designed for students to respond at frequent intervals during the broadcast. Programmes teaching mathematics to school-children in Nicaragua, for example, contained frequent pauses in which the children had to respond to the problem posed over the radio, or which they read in their workbooks. Similarly, programmes broadcast by

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radio schools in Latin America have often posed discussion problems for groups of students and then provided background music while listeners discussed the question and came up with their response before the broadcast continued. While this technique would not appeal to the casual listener, it could be suitable for some programmes for teachers.

Radio can be used for several distinct purposes: to provide subject teaching; to give examples of classroom practice; to illustrate a variety of alternative views through discussion; to encourage group discussion; to offer advice and information to students, especially on difficulties; and, through programmes based on feedback, to encourage dialogue between our institution and our distant students.

In subject teaching we may find that there are some parts of the subject that particularly lend themselves to radio. In Kenya the Correspondence Course Unit found that radio was particularly useful for their courses in Swahili and English. A subject such as poetry lends itself to radio, in other subjects where a voice can lead people through the text it can have particular advantages. It is useful, too, when it can bring resources to our students that would otherwise not be available to them. It can bring examples of reality, which would have much less impact through other media, even when this is possible. And there are some parts of many subjects that lend themselves to dramatisation, and radio can be of particular value for this.

Although there are technical difficulties in recording classroom sound, radio enables student teachers to eavesdrop on more experienced teachers and so learn something about classroom skills that they could not readily learn without sitting as an observer in the classroom.

One of the difficulties of correspondence education is that it forces students into a heavy reliance on the printed text. There is a danger that they will regard the correspondence text as being gospel

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rather than as being one of a number of different possible views on any subject. And yet the analysis, comparison, and criticism of different views lies at the heart of education at this level. Radio lends itself to discussion, and for our students, there is particular value in presenting discussions with alternative views presented by alternative voices.

Where several students, from neighbouring schools, are following the same course, then radio programmes can be used as the basis for group discussion. There are clear educational benefits from such discussions but it puts extra administrative burdens on a distance-teaching institution.

In studying at a distance many students need help that goes beyond teaching a particular subject. They need advice on techniques of study, as well as information about practical questions of such as entering for examinations or attending residential centres. They may need to be told about changes in arrangements, about misprints in their printed texts, or about other events or activities that may be of interest to them. Radio can perform a valuable service as a noticeboard in giving such advice and information.

Finally, a drawback of distance teaching is that it is very much a one-way process. There are often fewer opportunities for students to respond to their teachers than there are in a classroom or seminar.

This may be summarised as follows:

Radio programmes for distance education

- will generally not try to convey a great deal of detailed information;
- will be varied in their style;
- may demand student activity and response while the programme is being broadcast.

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Radio may be used for

- subject teaching;
- giving examples of classroom practice;
- encouraging discussion groups among students;
- providing advice and information to students both on their courses and on practical arrangements for study;
- programmes based on feedback from students.

Radio for Adult Education

Adult participation in formal education is increasing more than twice as fast as the population itself. This has been attributed to a number of factors:

- The duration of major Cultural changes is shorter than that of the individual's life
- The changing status of women in advanced industrial societies
- The increased movement between occupations.
- Rapid technological and social change. (skills and knowledge gained during traditional educational experience falling short of sustaining us during our lifetime.
- The structure of knowledge, technology, and words are becoming more and more complex and specialised.
- Consequently, more people have to continue to learn throughout their lives just to keep abreast of the job demands (Slight, 1986)

Radio has proved to be the ideal medium to serve adults since it can provide newly created information, can be used at home and at will. A variety of courses can be listened to by many people. Courses can cover modern subjects and for some extent the information it delivers can be constantly updated.

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Educational Radio

Crisell (1988) defines Educational Radio as "Programmes with a specifically documentary or educational purpose contain information which is to be retained - which is worthy of sustained attention and/or capable of constructive application."

"Traditionally the BBC has drawn a line between educative programmes, which are directed at the widest possible audience and impose no 'discipline of response' but whose contents are retained as a general impression rather than a body of knowledge or expertise, and the more truly educational output, which contributes systematically to the growth of knowledge and does ellicit a disciplined response." (Schuphan, 1967 in Crisell p. 107)

"Since educational broadcasting the listeners are likely to be either informed and more highly motivated than in educative broadcasting, problems of presentation and language are less insisted." (p. 109)

The IDCA (1983) report gives explanation to the medium advantages as an educational medium.

Although widely available in homes and villages, radios are not typically present in most school-rooms. Radio in the classroom still retains the attraction of novelty. Quality radio programming that is both entertaining and educational can create excitement and innovation in even the most isolated rural school. General familiarity with the technology, coupled with ease of maintenance, relative reliability of battery supplies, and the attractiveness of the medium make radio an ideal choice for classroom instruction.

Most importantly, radio stimulates the children to act, talk, sing, move, think, interact with the familiar voices of the characters they come to love. Studies show that children in these radio classes respond at a rate that is ten times that of children in regular classes.

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Radio can establish a uniform standard of excellence. The untrained teacher may lack knowledge and skills in the content areas, for example maths, science, or English. Radio can bring expert instruction into the classroom in support of the inexperienced teacher. Radio lessons can be designed and produced to take advantage of the most qualified teachers available for planning, writing, and teaching. Because of the numbers reached, more effort can be put into planning, more people can work on one activity. A standarised, high-quality instructional programme is then available to all students, irrespective of the quality of the particular classroom teacher.

Equally important, radio paces the lessons, providing variety, enthusiasm, and intensity, and structures the sequence of learning activities. Although radio cannot adjust to the moods of individual students, it does bring organisation and intensity to a lesson that, in the hands of an inexperienced teacher, may otherwise be chaotic and ineffective.

Radio instruction can be based on the best of educational methods. Radio programming lends itself well to the use of instructional design principles, with very clear objectives and instructionally effective techniques. Equally important, it permits programming to be tested on the basis of student learning and reward until it works.

Radio is cost-effective. Although the initial cost of developing quality radio programmes can be high, these costs are offset by savings in other areas and the unique potential of radio to serve so many children simultaneously. Radio programming requires fewer print materials and textbooks, and reduces the need to maintain cumbersome distribution systems for these materials. Teacher training, particularly in-service, can be made less costly. Quality radio lessons can provide regular orientation for teachers and headmasters in order to maximise effective use of the broadcasts.

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Analyses of the Nicaragua Radio Maths project further suggest that using the radio instructional programme may decrease the rate at which students repeat first grade, and by implication, other grades. If this holds true in other settings, the overall cost to the Ministry of Education of educating a student through the primary grades would decrease. Calculations show that if the repetition rate decreases by only two students per classroom, the radio programme pays for itself. The extent to which radio instruction prevents children from leaving school and the resulting benefit to the nation is incalculable.

Moreover, the technology should be planned and operated on a team basis. The team may consist of a producer, a communicator, a teacher a sociologist/psychologist/educationalist, a subject specialist and evaluator.

Radio is a familiar technology. No country on earth is without a radio station. In most developing countries radio is considered the primary contact with urban and rural populations.

Unlike other technology transfers, investments in radio programming do not require significant hardware training. Emphasis can be placed immediately on software development where the largest educational pay-offs are possible. In the classroom, radio is familiar to teachers. They feel in control and accept radio programming more willingly than other technological innovations. Broadcasting often attracts some of the most creative and talented people in these societies. They are career-oriented and tend to remain in broadcasting, providing a cadre of well-experienced technical and creative specialists difficult to replicate in other areas.

As an aural medium, radio can reach nonliterate audiences. This is generally seen as an advantage in adult education, but it is equally valuable in the education of young children. For them, radio can be used long before textbooks are practical.

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Radio can be combined easily with other instructional modes. Simple printed matter or props can be used to add a visual component to a radio-based lesson without detracting from the aurally presented message. Well-designed radio instruction can integrate classroom listeners into the programmes. From the experience of many countries throughout the world, radio is best used in combination with other media of communication.

Harnassing the medium for education.

As a broadcast medium, radio requires centrally developed programming. For educational purposes, this allows a degree of control over content and pedagogy that cannot be achieved through textbooks or teacher training. In the case of science instruction, for example, radio curriculum developers can have a direct influence on teaching methods as well as content, which may make possible a successful implementation of process-oriented science education that is sensitive to cognitive development constraints.

Radio instruction also presents special challenges. Initial costs may be high, particularly for innovative series projects. Broadcast radio is inherently a one-way medium, somewhat limiting the possibilities for responding to, and reinforcing, pupil responses in the classroom. Radio lessons proceed at their own pace, independent of the listener's response, and traditional educators often question radio's ability to visualise key aspects of science demonstrations or experiments.

"However, as colleges and universities tackle the problems of outreach posed by the needs of a changing student population, and as they look to the need for updating the competence of practicing professionals, radio is a medium that insists on attention. For though it is one of the least publicised, it is one of the most remarkable and efficient forms of instructional communication available to higher education.

> Among its many merits it is inexpensive to program and operate; under certain conditions, in fact, it is the least expensive of

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all delivery systems for reaching large numbers of students. It is an effective teacher; it lends itself to quick production of programs and to the easy revision of same. High cost television for example is difficult to revise; it can be used interactively; and it is easily available." (Forsythe)
U.S.A. research on Instructional Radio in higher Education)

Armour, C (1978) Head of Schools broadcasting Radio, BBC gives some hints in this regard

"With tape recording it is possible now for the teacher to have heard the programme before using it with pupils and students and to decide what preparation is necessary so they are both curious and ready to listen. The problem for the teacher is to know when to intervene, by stopping the tape to help clarify what has been heard and then to direct interest back to the tape."

Some programmes are readily divisible into sections, having been planned by the producer to be used either in parts, or as a whole; others, particularly the dramatic, gain impact by being heard as a whole without interruption.

For many teenagers it is difficult to concentrate on listening for ten or twenty minutes without being able to do other things, such as writing brief notes, following the text of the poem or part of the play available on the desk in a printed pamphlet designed to accompany the broadcasts, or on sheets duplicated by the teacher. An illustrated leaflet can provide a valuable aid to listening, if key pictures closely related to the text of the broadcast are there for the pupil to look at while listening. The classroom situation does not allow the teenager to be as active while listening as he might be at home; much can be gained in attention if more informal behaviour is allowed. This has important implications for teacher-student relationships.

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Supporting Visual Material and Radiovision

I have already indicated the value of illustrations which can be looked at while listening. Cartoon presentation with appropriate printed dialogue can readily attract attention because it is a form of communication well-known to the 12's to 20's through the comics, popular newspapers, and weekly illustrates that they can read outside school or college. Strongly emotive photographs can also reinforce the impact of the broadcast and impel the young listener to the point when he must talk or write about his own related experience.

The simultaneous combination of talk, music, sounds and enlarged, colourful illustrations gives particular value to radiovision; this is the use of a planned sequence of pictures, either as slides or as frames in a filmstrip, in conjunction with a recorded broadcast, the signal to move from one picture to the next being provided by a sound cue, or a printed cue in the programme text supplied with the programme notes. The advantages of radiovision lie in part in the high quality of projected colour pictures, and also in the facility given to the teacher to control it by returning to particular frames or stopping and starting as required. Radiovision has itself to be a distinctive medium which can be used over a very wide range of subject matter in a manner which will attract a good deal of attention from pupils.

"Support material can also include worksheets, simple or complex, designed by the teacher or supplied by the broadcasting organisation."(p.89)

One Sensory Channel

Those who question the use of radio for instruction often express concern at the fact that radio communication is limited to one sensory channel. That is an unsound argument, since print and other visual material can easily be provided as integral components of radio instruction just as they are for courses mediated by

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television. Some of the new technologies, such as teletext and viewtex, even permit the broadcast of visual material by radio.

Aside from that, however, there is a point that is central to the question of "single sensory input". Most educators were trained to believe that teaching effectiveness is positively related to the variety of physical senses employed in the process. This was based on early studies that purportedly showed that simultaneous transmission of redundant material through more than one sensory channel improved learning. However, these findings have not stood up under subsequent research. Moreover, the subsequent research suggests that at a given time during communication, one sensory channel of the person receiving information seems to predominate, and simultaneous presentation through two channels results in the blocking of one. Obviously a multichannel message presents options to the receiver that a single-channel does not; it would appear, however, that the receiver can attend seriously to only one channel at a time.

After reviewing the research on instructional television, Chu and Schramm also concluded that the effects of visual images on learning are not uniformly beneficial and seem to depend upon the kind of learning task involved. They may improve the learning of manual tasks, for example, but in many cases"... visual images may cause distraction and interfere with learning."

Indeed, the success of audio presentations of ostensibly visual material is frequently attributed to the fact that radio plays in the theatre of the mind.

Radio encourages listeners to use their imagination to visualise action. Because of this it is a more personal medium than TV and, in many instances, a better choice for evoking creative responses.

There has been a great deal of investigation comparing the relative teaching effectiveness of television, radio, film, computers, filmstrips, cassettes and various forms of print. The clear and

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unmistakable conclusion of these studies is that, in general, no significant differences in cognitive learning can be attributed to the medium used to present information.

Furthermore, there is the need for feedback mechanisms to be built into every distance education programme. As TV and radio are generally considered one-way media, programmed instruction too can become a form of monologue. There must therefore be a system of evaluation and learning from the receiving end.

Given these unequivocal findings, administrators clearly should be free to place much greater emphasis on cost when choosing among instructional media.

Cost

According to Chu and Schramm, "The rule of thumb is that television costs about five times as much as radio", telephone costs about twice as much for delivery of the same information; by FM radio sub-channels with fewer students it is more economical to make and mail tapes than to broadcast them.

Audio cassettes are already inexpensive enough for most institutions to provide copies for learning groups in on-site collections or to individuals studying at home.

Radio broadcasting combined with tapes of the broadcasts made right at the listening sites is probably the most flexible and economical means available of distributing information.

Schramm further stated that though data on the use of radio was too limited to generalise, it looked as though the cost of using radio per student-hour might be in the order of one-third to one-fifth of the cost of television used under comparable conditions. Vaizey, Howton and Norris stated that justification for the introduction of new educational technologies might be found in areas where there are too few teachers, or where teacher performance is poor, or where the

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subject itself inherently demands presentation that cannot be offered by a teacher.

There can be no short-cut to progress in the use of educational technology. The development and use of educational technology require much more planning and a longer gestation period than do the classical teaching methods. If mass media technologies are to be used, there must be a mass clientele. While it is true that the economies of scale appear most dramatic through the application of these new forms of educational technology, it is equally true that the unit cost can be too high when the target population is small and production costs are fixed.

Comparing Educational Media

Textbooks, television, CAL, films, all can contribute spectacularly to learning and to the effectiveness of a learning system, but none is really most effective for all kinds of learning and teaching. (Neither is the teacher, without the aid of certain media at certain times.) Gagne summed it up with scholarly caution when he said that "no single medium is likely to have properties that make it best for all purposes". (1965 : 363).

The first consideration in this respect is: what can't the teacher do and can be done by radio and still be suitable for the student on a certain content. That will be the area 3a in our model and is thus the most important area to be dealt with in School Radio.

However what is done in School Radio should fall in the fourth field (4) (field 4 constitutes part of field 3). Since although the teacher can't do that he still has to accept this programme and to cooperate.

Thus such a programme by no means will offend him or eliminate him as a functionare.

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For an example: a new scientific programme on "sounds in space" which can be produced on radio and can not be given by the teacher will also use the teacher help by inviting for example further teacher-guided activities by the subjects.

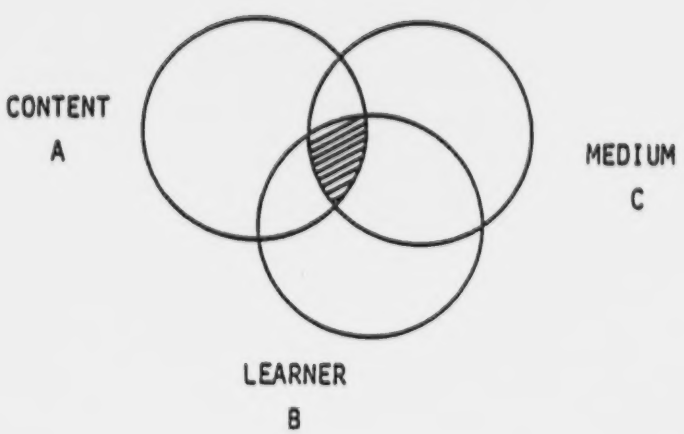
Areas 01-04 are typical areas that should be excluded from the radio educationalist work.

So are areas 2a, 2b, 2c and 3c, 3d.

The overlap zones 4 and 3a out main fields of interests. However in order to define them all other fields should be identified.

By comparing the four mass media Radio, TV, Newspaper and Teletext - or comparing the four electronic media Radio, TV, Computer and Teletext - one can apply the advantages of each medium to suit a characteristic group of users and characteristic contents. This approach is described in the following model:

Figure 1 Overlap Zone of the three Main Factors of the Learning process. (Duby 1985 p.8)



(A. DUBY 1985)

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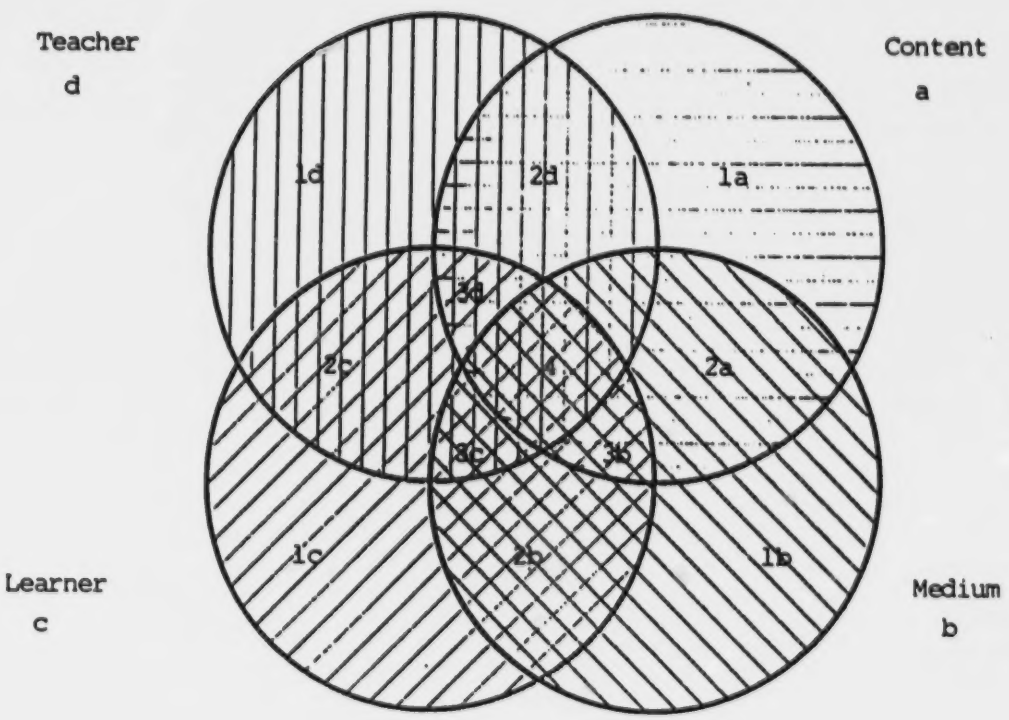
Segment type 3 represents an ideal target for development and evaluation. It represents the medium which it's features are suitable for the learners' identified qualities and also represent in the best way the content and objectives of the programme.

The model can be ammended, a fourth dimension can be introduced, for example the teacher. In another situation eg. Programme development the programme format can play the role of the fourth wheel.

Figure 2 Overlap zone of four Main Factors of a Process



(A. DUBY 1988)

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Radio as well as Television (and film and the theatre) are "real time" media. They "seem to be an account of what is happening rather than a record of what has happened" (Crisell, p. 11) They are also a 'real time' medium because the user is viewing or listening to the medium while the programme is going on. This feature gives the impression that the events are happening now. That is not the case with printed or computerised (including Teletext) materials.

This quality of radio is an advantage that can be used in documentaries and dramatised programmes but is a disadvantage when the retention of information is the objective of the programme.

Advertisers, for example, overcome this obstacle by repeating their advertisement over and over, and by recapping the information by using different means e.g. showing and telling (on TV), or saying and singing (on Radio). In formal education the radio producer can build in the same kind of techniques or insert instructions such as "please record this programme", or "write it down". By doing that he takes advantage of the fact that "radio time", namely broadcasting and/or listening time, is less expensive than television time.

It is a fact that among all mass media today, television is considered to be 'the entertaining medium'.

I will attempt to rationalise this phenomenon by saying that while watching TV, our main senses, sight and hearing are occupied, so our thoughts and imagination are relaxed while watching television. Only a few people will be active while watching television, and when they are, they can be physically active only: they will use their hands, mouths and feet for routine and simple activities such as eating, physical exercises, knitting, and such activities that still allow our brain to rest, passively accepting the TV message.

Clark (1984), in referring to TV and Radio, says that the ineffectiveness of these media is due to the loss of learner control over the pacing of learning.

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It is basically different with radio. While listening to the radio we can still do all of those simple activities, but we can do more. We can let our brain and our imagination conduct more sophisticated activities. We can write notes, we can look at other stimuli, in other words we are more spiritually activated and open minded when using radio than when using television. That is probably why people television is called the 'theatre of life' and Radio the 'theatre of the mind'.

We can generalise now by saying that the more explicit and more Technologically complicated the medium the less mentally activated the user.

This brings us to the main subject of this report. How can radio be used more effectively for educational purposes?

The answer: by harnassing its specific applications for educational technology. The implications of this idea are simple: if you want to instruct on how to knit, demonstrate it step by step on Television; so too if you want to show a vulcanic eruption and avoid the risk of taking your audience to the dangerous place and save on expensive trips. But if you want to educate them to solve problems, to use high cognitive skills, or to influence their cognition or feelings - use radio.

The intelligilbility of narrowcast language can be enhanced by one element of radio that is always missing from the print media : the speaker's voice .. his manner of delivery, the contrast of pace and tone, emotional stimuli of various kinds ... those enhance comprehension though at a slow rate.

Teletext uses the TV screen and uses the same colours as the TV; it uses the signs of words as radio and newspapers do; numbers and graphics are presented on the Telextext screen as on the personal computer screen. Teletext is a 'deaf medium', as is the newspaper, and also a 'non real time' medium, as are newspapers and computers.

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It's advantages over TV and Radio are that it can be used in one's own time and at one's own pace. However,some of these qualities - using the medium at will, repeating and selecting - can become Radio and TV qualities when cassettes are used.

Teletext makes much more information available to the user than can be offered by other media, and it is the only mass medium that gives the user control of the medium : the user can select the content he wants to attend to, the quantity, time, and timing. He can also use the concealed information to get some feed-back or more information. From this point of view it is a semi-interactive and self-controlled medium, but it is not a mass medium. The fact that the Teletext user is an active user rather than a passive one, as is the case with Radio and TV, makes it an attractive medium, to the learner in particular. However, concealed information or "feed-back" can also be given on radio by using pauses and attached instructions. ("Now listen and answer aloud"; "pause"; "the correct answer"). These techniques can convert Radio to Pseudo Interactive Radio. The "Call in" Radio programme makes the Radio fully interactive - however, the limitation of this system for Educational programmes is obvious: a television receiver costs from ten to twenty times more than a radio receiver. A television set for the average rural family is prohibitively expensive, and even a single community-purchased receiver is often beyond the collective buying power of a village or a small town.

The cost of television production and transmission equipment is also many times the cost of radio production and transmission equipment. It costs considerably more to reach isolated parts of a country by television than by radio.

Many countries have made enormous investments in an educational television system only to find that it soon drained their resources to the extent that little money was left to devote to the preparation of supplementary materials or the adequate training of field personnel. Some of these countries have re-examined their

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educational policies, and they have come to the conclusion that an established radio broadcasting system offers great financial advantages over a television system.

Radio invariably gives what is called a 'lower cost per unit' or, in this instance, a lower cost per person reached by the educational message.

The relatively low cost of radio in comparison with other media (such as television and even print media, when printing and distribution costs are considered) has resulted in the wide distribution and use of radios. In addition to the general public, schools frequently have access to radio receivers; e.g. Kenya is in the process of ensuring that virtually every school in the nation has its own radio. (Christenem, 1983)

Maintenance is an issue that cannot be overlooked, but the servicing of simple radio receivers is far less difficult than what is required for more complicated broadcast technologies. Whereas television sets depend on power lines, which are often unavailable in rural areas, radios can operate on batteries. Another advantage is that radio does not necessarily require the kind of expensive, cumbersome distribution system that so often causes textbooks to remain in cities instead of being used in rural schools. Instruction can be delivered, literally at the speed of sound, anywhere where there are radio receivers.

To obtain information from Teletext, newspapers, magazines, and other printed media, we must first learn to read; but once we have learned to speak our language, all we need in order to understand information from the radio is to pay attention to what is being said. Since most non-literate people receive a great deal of their information by word of mouth rather than by reading, radio takes advantage of the listener's pre-disposition to the aural mode and puts it to good use.

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As an aural medium, radio can reach non-literate audiences. This is generally seen as an advantage in adult education, but it is equally valuable for the education of young children who cannot yet read. For them, radio can be used long before textbooks are practical. Although in some circumstances radio's aural nature is considered a disadvantage, its advantages also are well validated in the literature, especially in the case of language instruction. Radio encourages listeners to focus their attention and use their imagination. This can be particularly beneficial for young children, especially when radio is complemented by effective visual media.

Another advantage of radio is the ease with which it can be combined with other instructional modes. Printed media or props can be used to add a visual component to a radio-based lesson without detracting from the aurally presented message. Well-designed radio instruction can also integrate classroom listeners into the programmes.

As a broadcast medium, radio requires centrally developed programming. For educational purposes, this allows a degree of control over content and pedagogy that cannot be achieved through textbooks or teacher training. In the case of foreign language instruction, for example, radio curriculum developers can have a direct influence on the quality of the language modelled, and the methods of teaching that language to children.

This advantage is particularly important where teachers are likely to be weak in the language and/or untrained in the methodologies that are now available for teaching foreign languages.

Disadvantages : Broadcast radio is inherently a one-way medium,(as is television) limits the possibilities for responding to, and reinforcing, pupil responses in the classroom. A good teacher can evaluate and react immediately to a class's performance; but a radio teacher cannot be certain of what is happening in the classroom when the lesson is broadcast. This is an important consideration in foreign language instruction, where there can be a variety of correct

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responses to a given stimulus (as opposed to arithmetic, for example, where there is generally only one correct answer.)

Radio lessons proceed at their own pace, independent of the listeners' response. This is a minor problem for bright children, who may become bored if the radio lessons move too slowly to challenge them. It can be a much more significant difficulty for slower pupils. If the radio lessons are not carefully designed, these children could fall further and further behind the instructional pace.

There are some problems with using an exclusively aural medium. For example, foreign language instruction requires a visual component for teaching a variety of skills, from vocabulary comprehension to reading and writing.

Printed materials can complement radio lessons to serve this function, but they create the need for a distribution system that would not be necessary otherwise. Television, on the other hand, can broadcast the visual as well as the aural message without relying on a physical distribution system (although it is highly unlikely that rural schools that have difficulty in obtaining printed materials could take advantage of television).

Another disadvantage is that all too often, radio lessons have not been designed to take advantage of the medium's strengths and to minimise its weaknesses. Instead, they simply have mimiced conventional classroom instruction. Little wonder that such lessons have not proved particularly effective.

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The following figure summarises some Radio Qualities

Figure 3

Facts concerning Radio qualities

physical qualities	portable can be used with or without electricity
main message (physical)	sounds (voices, music, radio codes, sound effects) silences (blind medium)
Educational qualities	Instigate imagination employs high cognitive skills: e.g.comprehension, analysis, evaluation, abstract thinking, problem solving thinking. Involves listener emotion. One-way medium.
Resources	Takes Less time, less money easier to rectify and up-date than TV.

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	Has the biggest audience of all media. Thus the most cost effective medium

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The following figure compares facts on the use of media.

Figure 4

Facts concerning Usage of the Medium

	IV	Radio	Teletext
Exposure	Electricity needed. Most of urban population some school other	Every one	Electricity needed High income urban population
Price of set	- R1 300	R50	R1 700(TV & Teletext)
Education required	no	no	matric level and other skills

In our generally enthusiastic response to television, it often seems that educational radio broadcasting has been neglected to a position of secondary importance.

This is unfortunate because radio broadcasting has much to offer and it is clearly not a poor relation of the newer medium (Teletext) or the more glamorous medium (Television).

No doubt TV is a more attractive medium than Radio. But there is no evidence that TV is a more educationally effective medium. As a matter of fact there is some research evidence that indicates that

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the two media effect audience learning equally, and learning is dependant on the learner more than on he teaching medium.

Educational Radio: Developing the Programmes

In this section the developing of educational radio programmes is dealt with. Some models of developing programmes are discussed. In general curriculum development approach is adapted, since it is the fundamental approach for all educational projects development. The reader is also referred to printed materials on ETV programmes development (Duby, 1987a p 172, 187, 213) and Educational teletext programme development (Duby, 1988a).

The following figure gives some comparisons concerning the development of the software of the three electronic mass media.

Figure 5

Facts Concerning Programme Development For The Three Electronic Mass Media (Duby, 1988)

Stage Of Development	TV	Radio	Teletext
Selecting the content	-	-	-
Adapting the content to the material qualities.	visuals/sound	sound/silence	text graphics/ computerised gimmicks
Medium	10-30 persons	3-5 persons	2-3 persons

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specialistics	persons highly qualified	highly qualified	qualified
Broadcasting Equipment	very expensive very sophisticated heavily booked	less expensive very sophisticated heavily booked	priced reasonably very sophisticated usually booked.
Time	months/year	weeks/months	days/weeks
Production money ($)	hundreds of thousands	hundreds/thousands	hundreds/ thousands
Modification	very expensive (if possible) time consuming	usually possible to reproduce, less expensive takes less time than TV	easy to change and to update (as easy as letter typing)

The following is a summary of some Radio formats (quoted from De Fossard, (1973)

Drama: A drama is a fictional work in which the actors play the parts of believable people engaged in realistic activities. The story develops through what the characters say to one another. Sometimes sound effects are used to help the audience understand the setting of the play or certain events in the play - for example, the sound effect of fire crackling may be used to help the listeners understand that the drama is dealing with a fire in a village. Drama is a very effective format because it allows the listeners to become personally involved in the lives of the people being portrayed by the actors.

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Story: In this type of program, a narrator (or storyteller) tells the story. There are no actors playing the parts of the characters; the narrator is the only person we hear. Sometimes the narrator might alter his or her voice as he reads the speeches of the various characters in the story, but where the drama uses a number of actors, the story uses only the one narrator who reads to the audience.

Interview: In this type of programme, an announcer or a reporter asks questions of someone - usually someone recognised as an authority in his or her field. The questions are designed to encourage the interviewee (the person being interviewed) to give the listeners the type of information they need to understand the topic. In an interview programme, the listener can hear both the interviewer asking the questions and the interviewee giving the answers.

Discussions: This programme will use a number of authorities giving their views on a particular topic. It is also called a "panel discussion programme." A panel discussion often uses a chairman or a moderator to control the discussion and direct specific questions to the various members of the panel.

This programme format is particularly suited to a topic that has more than one acceptable point of view. For example, the question of family planning is a suitable topic for a panel discussion - there are those who will speak in favour of it and those who will speak against it, and there is really no definite right or wrong answer in every situation.

Speech: A speech is a formal presentation by an important authority. It is usually delivered by a person in high position on an important occasion. It is rare that a speech is used as a format for delivering the type of information that would be used by a radio listening group. A more suitable format would be the -

Talk: A talk is a less formal version of a speech. It is usually given by someone who is a recognised authority in the field and may

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contain opinions as well as facts. This makes it very suitable for use by a radio listening group who can air their own feelings about the speaker's opinions.

Magazine: A radio magazine programme does much the same things as a printed magazine:

a. it presents a number of different ideas on one particular topic, or

b it presents a number of different ideas on a variety of different topics.

A radio magazine programme can combine a number of different formats - for example, you might find a short drama, an interview, a news announcement, and a spot (see below) in the same magazine programme.

News: As its name indicates, a news programme gives information on the latest news - things that are happening now.

Documentary Feature:

A documentary (or feature) takes an event that has happened in the past and makes a special programme of it in order to highlight particular points that the producer would like the audience to be more aware of. Sometimes the subject of a feature will be set in the future, in which case the feature is making some suggestions about future possibilities, rather than reporting on some real event that happened in the past.

Spot: A spot is a very short announcement (usually no more than three minutes) that gives only the most important information on a particular topic. The Health Department, for example, might run a series of spots to remind people to have cholera shots.

Jingle: This is similar to a spot, but it is set to music. A jingle is often associated with advertisements, but the use of any message

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set to music can be a very effective way of catching the audience's attention.

Quiz: a quiz is an interesting way of inviting an audience to find out how much they know on a certain topic. There are two types:

a. the quiz where two or more teams compete against one another in answering a set of questions. Usually a prize is given to the team that answers the most questions correctly.

b. the quiz where one announcer poses the questions ... then a 10-second pause is left in which the audience can attempt to answer the question in their homes, and then a second announcer gives the right answer.

Question & Answer: This type of programme can be done by inviting listeners to send in questions by mail, or to record their questions on tape for a visiting reporter. In either case, the radio programme provides an expert or experts to give the answers to the questions posed by the audience. It is important to exercise tight control over a question and answer programme, so that people do not abuse the airwaves by using the programme to air all sorts of gripes and grievances.

When an educational radio programme is planned one can integrate the format qualities with the other basic elements qualities; The Learner, the Content and the Medium (Radio) and find the best radio format to suit your audience listening skills and their educational needs and background and that will be the suitable carriage for the content you wish to convey. Try to use this model.

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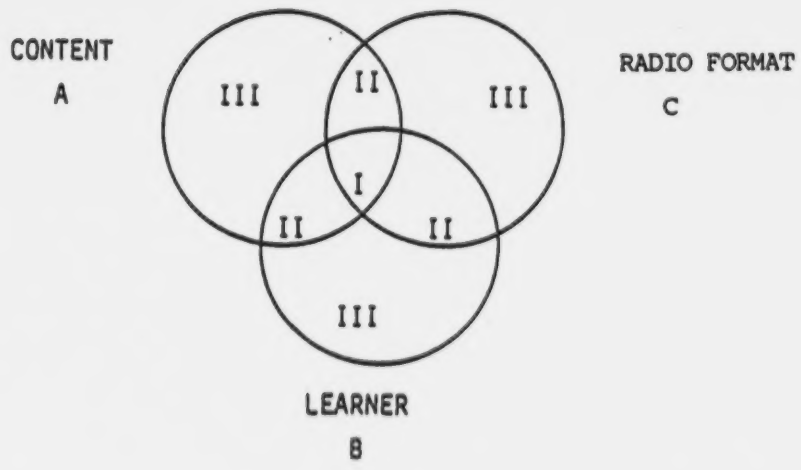
Figure 6

Overlap Zone of three Main Factors of an Educational Radio Programme



(A. DUBY 1985)

Area 3 in figure 6 represents the best radio format that suits our learners' cognitive and affective skills and the content's scientific and educational qualities.

Let's look at radio as an educational medium. What can we learn from other models of developing educational programmes, and what should be our structure of radio programme development?

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Pre-planning : Is Radio educationally effective?

The following are quoted from Muller's report P 144-169:

"The answer to this question is clearly in the affirmative. Radio can produce significant educational results, if contents are properly and sufficiently used. Case studies show that it can meet a great variety of educational needs, both in-school and out-of-school, and can make a significant difference in the quantity and quality of learning. But good results are not automatic; they depend on how the medium is applied to a problem and whether is competently used; in particular, the best results come only when the new programmes are well integrated within a larger educational context.

What we would emphasise above all else to any potential user of new media is that the principal aim of using any new educational medium is to stimulate and promote learning activities at the receiving end. For this to happen, the media must be integrated, just as a textbook or a black-board must be, with all the other learning elements in the receiving situation. The media should not be expected to do the whole job themselves, and they should not be simply superimposed on the previous pattern of activities as a kind of fringe benefit.

They should change the previous pattern and become a new and integral component of a new or modified total teaching-learning system, whose purpose is clear and whose various components are well integrated and mutually reinforcing.

Supporting Communication and Evaluation

For this kind of service to operate well there must be a steady flow of information, ideas and assistance among all the main parties involved. Failure here has often been a major source of inefficiency.

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This kind of supporting communication must be provided for so as to cover the following critical functions:

1. Participation by prospective users in deciding what programmes are to be offered, in what form, and how they will be used. Early discussions with representative class-room teachers and headmasters will greatly increase the acceptability and actual use of the new service.

2. Continuous consultation and co-ordination among all those at the centre whose combined efforts are required to make the system work - the broadcast and educational policy-makers, the educational-programme people, the technical people, and the evaluators.

3. A reliable flow of information and technical assistance from the centre to the users, particularly the teachers and monitors who must orchestrate the learning resources and activities at the receiving end. This includes advance notice to teachers of what programmes are coming and when, advice as to what they should do to prepare and to follow up, and suggestions on handling special problems. They will need visits fairly often from informed persons who can coach them (if necessary), encourage them, listen to their problems and help solve them. It is essential that they feel like important members of a team - which they indeed are - not like forgotten men.

4. A feed-back flow, from users to the centre, of evaluation data which can be used to check the performance and effectiveness of the system. This includes specific comments by teachers, students, and observers on broadcast programmes and on the complementary materials; on student interest, motivation, attendance, and performance; and on technical problems encountered. This feed-back should be as regular, as frequent, and as uninhibited as possible. Adequate provision should exist

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at the centre for digesting such information promptly and putting it to work to improve all aspects of the system. Besides receiving written reports - and often far more valuable - the studio teachers and other observers should visit class-rooms when they can, to see for themselves how the programme is working.

If possible, you will probably want to have workshops with teachers from various reception points. (Your studio teachers, incidentally, will need much self-confidence, a 'thick skin' and a large capacity for self-criticism and flexibility. They will have to learn much on the job, and their second time round will be better than the first.)

The logistics for these various forms of supporting communication will require careful planning. Some can be done by mail, but in many places the mail service is unreliable. Some will require travel - the professional visits, for example

Training Provisions

The human resources in a system such as this are even more critical to success than all the technical resources, and the most important human resources are usually in short supply. This is why so many new-media projects depend heavily on foreign personnel to get started, but the object should be to develop competent local personnel as quickly as possible. Too often the outside expert - or the scarce local expert - is so busy 'operating' that he finds no time to train his successor, until it is too late. Thus, it is of great importance that specific training arrangements for all types of personnel be made an integral part of your plan. And do not forget the training of the teachers or monitors on the receiving end, upon whom depends the ultimate effectiveness of the whole effort. Skimping here is poor economy."

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Analysing the Audience

This activity is actually part of the pre-planning (see also figure 1.)
Basic needs of the target audience should be identified, also the level of vocabulary and level of concept understanding e.g. Do the people you are working with learn best by many varied examples? Do they require detailed explanation of very simple materials before proceeding to the more difficult, or do they grasp principles quickly?

Target audience age, sex, other cognitive and psychomotoric qualities should be revealed.

Attitudes

A very important factor in any programme of instruction is how the learners feel about learning from radio, e.g. first time as participants in a structured learning programme, you might have to explain, without going into excessive detail, about sound-wave transmission characteristics, how radio is able to carry the human voice, music and sound effects over considerable distances. The learners must understand, too, that the radio professors, or speakers, although not physically present, are still concerned about contributing to the learning experiences of the students. Sometimes inexperienced listeners do not completely trust radio as a means of conveying information and education.

It is not tangible or visible and, to people who have always relied to a great extent on non-verbal patterns of communication, there are no gestures, facial expressions of bodily postures by which they can judge the credibility or sincerity of the speaker.

You must try to convince the listeners that radio broadcasting as an integral part of a structured educational programme is a legitimate

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and positive influence. You may have to spend a great deal of time in establishing a feeling of trust and confidence in radio broadcasting but, without it, it is unlikely that radio broadcasting will ever realise its full potential as a learning instrument.

In other situations, the listener who participates in a programme of structured learning in literacy must perceive radio as a device which can be taken seriously. Although it might have its primary identity as a pleasant means of passing leisure time, it can also be used to accomplish other purposes.

Some of the IDCA (1983) recommendations are quoted here:

Rigorous Instructional Design

The key to ensuring that children learn efficiently through radio lessons is to design the lessons following a set of systematic, sequenced, and practical procedures. If instructional design is haphazard, the benefits of central control over content and pedagogy are lost. There is no way to ensure that the entire curriculum is covered completely and effectively. Those components that are more difficult to teach by radio, or that fall outside of the professional team's strengths and interests, are likely to be neglected. if instructional design is not practical, precious resources will be expended in a fruitless effort to pursue academic goals unsuited to the realities of cost-effective education in a developing world.

Programme Preferences and Listening Habits

When you have started to work with a particular group of learners, you will discover that they soon develop very pronounced preferences for programme formats, styles of presentation and methods of information delivery. They may become easily absorbed in the dramatic format, they may become emotionally involved with some characters and not others, or they may miss important points by concentrating too hard on incidental information. It is important for the planners to

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know early in the development of the literacy project which type of programmes are likely to be well received and which are not. (The use of the model described in figure 2 is applicable here)

Another important aspect of programme preference is the pattern of work and leisure-time habits predominant among certain groups of listeners. It is important to the broadcaster to know, for instance, what time men and women start their daily work, what times they return to their homes, how they use their leisure time on weekends and holidays. Many excellent programmes have gone unheard in many countries because of a misunderstanding regarding the schedules of the intended audiences. For example, if you are interested in reaching all members of a family, your broadcast times are really quite limited. You can expect to reach all members of a family only very early in the morning or in the early evening hours. It is especially important to provide this kind of information early in the project, so that productive patterns of programming can be established quickly and non-productive patterns can be eliminated or substantially reduced.

Instructional design must begin with a curriculum. The projects remain faithful to the approved syllabus, particularly as it is reflected in standarised national examinations. The primary focus is on methodology - how the agreed-upon, curriculum can best be taught with the help of radio.

The curriculum must be translated into an Instructional Design Document (IDD) that can be used to direct the writing and evaluation of the various system components. The IDD becomes the primary source of guidance to the content specialists and to the curriculum and materials specialists on a lesson-by-lesson basis.

The IDD is often organised by weeks. For each week, measurable instructional objectives (cognitive, affective, and psychomotor) are specified for each content area being covered at that time. These objectives are categorised by appropriate instructional media; that

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is, whether a given objective can be taught using the radio only, whether ancillary materials (printed booklets, apparatus, etc.) are required, and what non-radio (teacher-led) classes are needed for objectives that cannot be completely or efficiently taught by radio. The larger context of the week's objectives, in terms of the overall organisation of the curriculum, will be elucidated, and general pedagogic approaches and examples of the intended content for the week may be given.

If the instruction is to be carried out in English, a second language for the students, a cumulative vocabulary list may be provided to indicate what scientific words have been mastered and what words may have to be taught for the first time.

The objectives and recommendations in the instructional design document are used by the lesson planners to specify the content of every segment of every radio lesson and of all ancillary materials. These instructional objectives also provide the basis for the formative evaluation system which lies at the heart of program success. Once the radio lessons have been broadcast, student performance is measured against this standard. Where performance is inadequate, the instructional methodology is revised (in part on the basis of the observers' reports from the schools), and the objectives will be covered again in future lessons. The cycle continues until all objectives have been mastered satisfactorily by students in the schools.

Suggested Model for Developing an Educational-radio Programme

Following the scrutinising of the literature and our models for developing ETV (Duby, 1987) and Educational Teletext, I will attempt to suggest a model for our own use.

1. Research: What is needed: needs assessment, needs analysis.
   What is need most? Which of these needs we can fulfil.
   For whom? : Audience analysis. Prerequisits.

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Who needs what? Definition of relevant audience qualities (effective, cognitive and psychomotoric).
How? Analysis of content with reference to the target audience and the media. Select the medium, is radio the best medium? (Educationwise, economicwise and content wise).

2. Writing the rationale: Researcher should advise or help with the definition of objectives.

3. Preproduction: Subject expert in conjunction with education specialist write the preliminary script.

4. Early Formative Evaluation: Evaluator compares declared objectives against existing objectives, puts objectives according to hierarchy. Evaluator uses experts advice to evaluate the script according to scientific and medium standards.

5. Script: A radio specialist converts the written content to radio script. Using radio codes: words, sounds, music and silences and techniques: e.g. repetitions sound effects, sound, interactive tricks etc.

6. Formative Evaluation : Criteria : Are content and objectives interpreted correctly. Will they be simple and clear to the specified target audience?
Are radio codes used effectively?

7. Pilot Programme : Evaluator and producer select a typical episode or representing segments to be produced. The Pilot programme is produced.

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8. Late Formative

Evaluation : Testing the pilot programme with a sample or representatives of target audience. Criteria : Is the programme liked, understood, convincing? Concentrate on issues that are in doubt, try to identify typical strong and weak points, produce guidelines for improving the programme.

9. Final Production : By Radio experts.

10. Summative

Evaluation : If, then formative orientated. Evaluate typical issues, come up with constructive generalisation to enlight future productions. Cost analysis : Staff training needs assessment.

Representative programmes can be tested on large scale for appreciation and merit.

Suggested Model for Educational-radio Script (ERTV, SABC)

Title: _____

Format : (key words, Drama, monoloque, dialogue, interview, documentary, music ...)

_____

Script (text)	Descriptive key words	
	Voice	Sound
	Male, female, baby, child	1 conic (simmulation)
	(age) adult.	Index
	deep, whisper, loud	Symbol

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Title	Descriptive key words	
	Voice	Sound
	Main-background ...	Silence Music : main background fades in, fades out ...

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